

### **REMARKS/ARGUMENTS**

Reexamination and reconsideration of this application, withdrawal of the rejections, and formal notification of the allowability of all claims as now presented are earnestly solicited in light of the above claim amendments and remarks that follow.

Claim 1 has been amended to incorporate the subject matter of claim 10 and to further recite steps for obtaining the solid cross-linked foam coating on the heat sensitive stencil master. Claim 19 has likewise been amended to incorporate the subject matter of claim 24. Support for the amendments can be found throughout the specification as originally filed, and particularly at pages 4 and 5. Claims 10 and 24 have been canceled. Claims 1-7, 11-15, 17, 19-21, 26, and 31-37 are pending in the present application.

Claims 1, 2, 10-11, 13-15, 17, and 32-34 stand rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 6,372,332 to Arai *et al.* Applicants respectfully traverse this rejection.

Claim 1 recites a heat-sensitive stencil master comprising a heat-sensitive polymeric film having a thickness of less than 10  $\mu\text{m}$  and, coated thereon, a solid cross-linked foam coating comprising a foaming agent. The solid cross-linked foam coating is obtained by the following steps: 1) coating onto a heat-sensitive polymeric film a liquid foam comprising a foaming agent and a resin dispersed or dissolved in a volatile liquid; 2) drying the liquid foam to form a solid foam; and 3) cross-linking the solid foam by irradiation to form a solid cross-linked foam coating. Applicant respectfully submits Arai *et al.* fail to disclose or suggest a heat-sensitive stencil master comprising a solid cross-linked foam coating obtained by the recited steps.

A liquid foam, as used in step 1) above, comprises air (provided by the foaming agent) dispersed in a continuous liquid phase. After formation of the liquid foam, it is dried to form a solid foam. Finally, the already-solidified foam is cross-linked by irradiation. The steps used for obtaining the solid cross-linked foam coating lead to the use of specific components and methods making the presently claimed heat-sensitive stencil master distinctly different from the stencil disclosed by Arai *et al.*

For example, page 4 (third full paragraph) of the present specification discloses that the resin used in step 1) above is capable of being incorporated into a volatile liquid to form a liquid foam. Moreover, the resin, as a liquid foam, can be dried to yield a solid foam. Further, as

recited in claim 1, such drying is carried out prior to cross-linking by irradiation. Page 5 (lines 15-24) of the present specification points out that when cross-linking is by irradiation, the liquid foam must be capable of forming a solid foam prior to irradiation.

Applicant has surprising found that drying the liquid foam prior to cross-linking by irradiation is essential to formation of a proper end product. Specifically, if cross-linking is carried out while the foam is in the liquid state, Applicant has found that the foam collapses. By contrast, if the liquid foam is dried to form a solid foam that is then cross-linked by irradiation, the foam does not collapse.

Arai *et al.* do not disclose or suggest the claimed solid cross-linked foam coating obtained according to the noted steps. The composition of Arai *et al.* is based upon emulsion technology and does not form a liquid foam that is dried to form a solid foam that is subsequently cross-linked by irradiation. In particular, Arai *et al.* disclose a method of forming a thermosensitive stencil paper comprising a porous resin layer which is formed by coating a porous resin layer formation coating liquid on one side of a thermoplastic resin film (column 3, lines 26-34). Arai *et al.* further disclose that the porous resin layer formation coating liquid is a water-in-oil emulsion of a resin (column 3, lines 49-55). In other words, Arai *et al.* disclose the use of a dispersion or water in a continuous resin phase. This is in direct contrast to the present invention. Specifically, claim 1 recites a liquid foam comprising a foaming agent and a resin dispersed or dissolved in a volatile liquid (which may be water). Thus, in the present invention, water (or other volatile liquid) comprises the continuous phase and the resin comprises the dispersed phase. In Arai *et al.*, the resin comprises the continuous phase and water comprises the dispersed phase.

Applicant further points out that in the claimed heat-sensitive stencil master, the solid cross-linked foam coating is obtained by using a liquid foam. Arai *et al.*, however, nowhere disclose or suggest formation of a foam. On the contrary, Arai *et al.* actually disclose that it may be desirable to add an anti-foaming agent to its porous resin layer formation coating liquid.

The distinction of the present invention over the disclosure of Arai *et al.* is further exemplified by the further description of the Arai *et al.* emulsion technology at column 4 (lines 30-41). Therein, formation of the porous resin layer formation coating liquid is described such that the resin is dissolved in a good resin solvent followed by addition of a non-solvent, or bad

resin solvent. At column 4 (lines 45-54), Arai *et al.* goes on to disclose that the coating formed with the porous resin layer formation coating liquid is dried by first evaporating the good resin solvent to precipitate the resin component and thereafter eliminating the bad resin solvent by heating. Thus, the specific steps for removal of the two solvents in Arai *et al.* are key to formation of the disclosed porous resin layer.

Applicants point out that the Arai *et al.* method is described at pages 2-3 of the present specification with specific reference to GB 2 332 868 and GB 2 345 912. As noted therein, the Arai *et al.* process includes various disadvantages, including the necessary use of volatile solvents and the environmental implications associated therewith, and the complications of achieving controlled drying so as to form the desired porous layer. Without this control, water may remain trapped in the porous resin layer, or water may evaporate too quickly and result in formation of a continuous film rather than a porous resin layer. The Arai *et al.* approach is also limited in terms of the resins with which it can be used. The present invention is not constrained by such a limitation.

Applicant further submits the porous resin layer formation coating liquids disclosed by Arai *et al.* are not capable of drying to a solid foam prior to cross-linking, as presently claimed. To this end, Applicant points out that the only disclosure by Arai *et al.* in relation to cross-linking is that the porous resin layer formation coating liquid may further comprise a cross-linking agent (*i.e.*, a chemical compound) as an optional additive (column 8, lines 44-45). Arai *et al.* provide no disclosure as to why a cross-linking agent may be desirable or necessary. Moreover, Arai *et al.* provide no disclosure as to when cross-linking is carried out. Since the optional cross-linking agent is added to the porous resin layer formation coating liquid, a skilled artisan would reasonably conclude that at least some (if not all) cross-linking occurs prior to drying of the liquid coating. As presently claimed, cross-linking is carried out after drying the liquid foam to form a solid foam. Further, in the present claims, cross-linking is carried out by irradiation, and addition of a cross-linking agent is not required to achieve cross-linking.

Applicant points out that the presently claimed resin product formed by irradiative cross-linking is chemically distinct from a resin product formed by use of a chemical cross-linking agent, such as the Examiner alleges Arai *et al.* disclose. As pointed out above, when a chemical cross-linking agent is used, the chemical cross-linking agent is necessarily incorporated into the

resin structure (*i.e.*, the chemical cross-linking agent remains in, and becomes part of, the final product). Thus, the chemical structure of the resulting resin structure in Arai *et al.* is altered to include the chemical cross-linking agent. In the presently claimed invention, though, where irradiative cross-linking is used, the cross-linking process is one of self-reaction by olefinic addition (*i.e.*, a radical process) or onium group condensation (*i.e.*, a cationic process). Thus, no separate cross-linking agent is required, and no chemical cross-linking agents are incorporated into the chemical composition of the final resin structure of the claimed invention. Thus, the product of the present claims is structurally different than the product in Arai *et al.*

In light of the above, Applicant submits Arai *et al.* fail to disclose each and every aspect of the presently claimed invention. Arai *et al.* do not disclose a heat-sensitive stencil master comprising a heat-sensitive polymeric film having a thickness of less than 10  $\mu\text{m}$  and, coated thereon, a solid cross-linked foam coating comprising a foaming agent. Furthermore, Arai *et al.* do not disclose a solid cross-linked foam coating is obtained by coating onto a heat-sensitive polymeric film a liquid foam. More specifically, Arai *et al.* do not disclose use of a liquid foam comprising a resin dispersed or dissolved in a volatile liquid (e.g., a W/O emulsion). Rather, Arai *et al.* describe O/W emulsions (e.g., resin dispersed in water). Still further, Arai *et al.* do not disclose drying a liquid foam to form a solid foam prior to cross-linking. Yet further, Arai *et al.* do not disclose cross-linking, after drying, by irradiation. Accordingly, Applicant submits Arai *et al.* fails to disclose each and every aspect of the presently claimed invention.

Applicant also submits Arai *et al.* fails to make obvious the presently claimed invention. As pointed out above, the steps for obtaining the solid cross-linked foam coating of the invention are fundamentally distinct from the technology relied upon by Arai *et al.* in preparing its coating. Based upon the distinct differences in the technologies, Applicant submits a skilled person would not find any teaching or suggestion in Arai *et al.* that would lead to the present invention.

Additionally, as previously pointed out, the only disclosure by Arai *et al.* in relation to cross-linking is the disclosure at column 8 (lines 44-47) that a cross-linking agent is one of several optional additives (including antistatic agents, agents for preventing sticking, wetting agents, antiseptic agents, and anti-foaming agents). Arai *et al.* do not include a cross-linking agent in any specific examples. Moreover, Arai *et al.* provide no teaching or suggestion that the addition of a cross-linking agent is beneficial or necessary to achieve a particular purpose. The

mere disclosure of a cross-linking agent in a list of optional additives without any further disclosure cannot be viewed as forming a reasonable basis to motivate a skilled person to form a solid, cross-linked coating, as presently claimed.

More particularly, Applicant points out that Arai *et al.* provide no disclosure or suggestion around cross-linking by any means other than addition of a cross-linking agent (*i.e.*, a chemical cross-linking compound). Thus, if a skilled person did rely upon Arai *et al.* as teaching cross-linking, Applicant submits Arai *et al.* can only fairly be relied upon as suggesting cross-linking by addition of a chemical cross-linking compound that is physically incorporated into the liquid resin coating and chemically incorporated into the final coating. Specifically, Arai *et al.* provide absolutely no disclosure that can be relied upon as teaching or suggesting any cross-linking method apart from addition of a chemical cross-linking compound. Certainly, the disclosure in Arai *et al.* that “the porous resin layer formation coating liquid may further comprise a crosslinking agent” cannot be viewed as teaching or suggesting irradiative crosslinking, as presently claimed.

Further to the above, Applicant respectfully submits that even if a skilled person was motivated to use irradiative cross-linking with the further disclosure of Arai *et al.*, which Applicant does not admit, such use of irradiative cross-linking still would not result in the composition of the present invention. As pointed out above, the disclosure in Arai *et al.* around use of a cross-linking agent in its liquid coating composition suggests that cross-linking is to be carried out prior to drying the coating. Applicant submits, however, that cross-linking the coating of Arai *et al.* by irradiation, without first drying to yield a solid foam, as presently claimed, would not result in a solid, foamed coating. Rather, the irradiated liquid foam would collapse.

In light of the above, Applicant submits that the use of irradiative cross-linking is not merely an obvious alternative to the use of a chemical cross-linking agent. Each cross-linking method has separate requirements and achieves separate end products, and a skilled person would not be motivated to simply substitute irradiative cross-linking for chemical cross-linking absent some further disclosure or suggestion, which the Examiner has failed to provide. Moreover, the Examiner has failed to point to any portion of Arai *et al.* that discloses or suggests the liquid coating composition must be dried prior to cross-linking, as presently claimed. Still

further, Applicant submits the mere disclosure of the use of an emulsifier does not disclose or suggest the formation of a liquid foam that is subsequently dried and cross-linked. Accordingly, Applicant submits the presently claimed invention is not obvious over Arai *et al.*

Applicant further submits that the non-obviousness of the presently claimed invention is illustrated by the surprising increase in tensile strength and stiffness when the claimed stencil master is prepared using the recited steps. Applicant specifically directs the Examiner's attention to Examples 5, 6A, and 6B on page 18 of the present specification. The results of these examples are provided in Table 4 on page 25 of the present specification. In particular, the compositions of Examples 6A and 6B use the same liquid preparation, but Example 6B was cross-linked after drying by irradiation while Example 6A was not cross-linked. As seen in Table 4, the coating of Example 6A exhibited a stiffness of 15 mN while cross-linked Example 6B exhibited a stiffness of 120 mN, an eight-fold increase in stiffness. Similarly, the tensile strength of cross-linked Example 6B (0.72 kgF) was more than double the tensile strength of uncross-linked Example 6A (0.33 kgF). Example 5, which was uncross-linked and used a different resin, also exhibited reduced stiffness (75 mN) and tensile strength (0.33 kgF) in relation to cross-linked Example 6B. These improved physical properties further support the non-obviousness of the presently claimed invention over the disclosure of Arai *et al.*, which does not disclose or suggest irradiative cross-linking after drying its liquid coating composition.

In light of the above comments, Applicant respectfully submits the presently claimed invention is neither anticipated by nor obvious over the disclosure or teaching of Arai *et al.* Accordingly, Applicant respectfully requests reconsideration and withdrawal of the present rejection.

Claims 3-7, 19-21, 24, 26, and 35-37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Arai *et al.* in view of U.S. Patent No. 5,908,687 to Mori. Claim 12 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Arai *et al.* in view of U.S. Patent No. 4,507,458 to Shiraki *et al.* Claim 31 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Arai *et al.* in view of Mori and further in view of JP 11-1799699 to Yoshida (U.S. 6,357,347 being relied upon as an English language equivalent). Applicant respectfully traverses these rejections.

As pointed out above, the composition of the present invention is distinguished from Arai *et al.* by the particular steps used in obtaining the solid cross-linked foam coating. Specifically, Arai *et al.* do not disclose or suggest irradiative cross-linking of a liquid foam that has been dried prior to cross-linking. None of the cited references overcome this deficiency. Specifically, neither Mori nor Yoshida make any mention of cross-linking. Shiraki *et al.* disclose urethane acrylate resins obtained by reacting a polyisocyanate with a polyester polyol. The disclosed resins can be cross-linked by irradiation, but the Examiner has failed to provide any motivation or suggestion for combining the references. Arai *et al.* provide no disclosure or teaching in relation to irradiative cross-linking (or cross-linking technology generally), and Shiraki *et al.* do not disclose or suggest thermosetting stencil papers. Accordingly, the Examiner has provided no nexus between the two references absent impermissible hindsight based on the present invention. Thus, Applicant respectfully submits the combination of the cited references with Arai *et al.* still fails to disclose or suggest the presently claimed invention. Accordingly, Applicants respectfully requests reconsideration and withdrawal of the present rejections.

For the reasons provided above, Applicants respectfully submit all claims are in condition for allowance. Accordingly, Applicant respectfully requests that all rejections be withdrawn and a Notice of Allowance be issued in due course. If any minor informalities need to be addressed, the Examiner is directed to contact the undersigned attorney by telephone to facilitate prosecution of this case.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR §1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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